

We Claim:

1 1. A method of manufacturing a liquid-crystal display
2 element; the method comprising a rubbing step of bringing a rubbing
3 roller the surface potential of which has been controlled into contact
4 with an alignment film formed on the surface of a substrate member,
5 to subject the alignment film to rubbing.

1 2. The manufacturing method according to claim 1, wherein
2 the surface potential of said rubbing roller is controlled by bringing a
3 charge control member into contact with the surface of said rubbing
4 roller.

1 3. The manufacturing method according to claim 2, wherein
2 the potential of said charge control member is controlled.

1 4. The manufacturing method according to claim 2, wherein
2 said charge control member is covered with a material capable of
3 being contact-charged to a polarity different from the potential of the
4 substrate member surface.

1 5. The manufacturing method according to claim 1, wherein
2 the surface potential of said rubbing roller is feedback-controlled in
3 accordance with a measured value obtained by measuring the

4 potential of said rubbing roller and the potential of said substrate
5 member.

1 6. A method of manufacturing a liquid-crystal display
2 element; the method comprising:
3 a rubbing step of bringing a rubbing roller into contact with an
4 alignment film formed on the surface of a substrate member, to
5 subject the alignment film to rubbing;
6 the surface potential of said rubbing roller being controlled to
7 have the same polarity as the potential of said substrate member.

1 7. The manufacturing method according to claim 6, wherein a
2 charge control member is brought into contact with the surface of
3 said rubbing roller, and the potential of said charge control member
4 is controlled.

1 8. The manufacturing method according to claim 7, wherein
2 said charge control member is covered with a material capable of
3 being contact-charged to a polarity different from the surface
4 potential of said substrate member.

1 9. The manufacturing method according to claim 6, wherein
2 the surface potential of said rubbing roller is feedback-controlled in
3 accordance with a measured value obtained by measuring the

4 potential of said rubbing roller and the potential of said substrate
5 member.

1 10. A method of manufacturing a liquid-crystal display
2 element; the method comprising:
3 a rubbing step of bringing a rubbing roller the surface potential
4 of which has been controlled into contact with an alignment film
5 formed on the surface of a substrate member, to subject the alignment
6 film to rubbing;

7 the surface potential of said rubbing roller being so controlled
8 that;

9 the potential of said substrate member and the surface potential
10 of said rubbing roller have the same polarity in accordance with a
11 measured value obtained by measuring the surface potential of said
12 substrate member and the potential of said rubbing roller.

1 11. The manufacturing method according to claim 10, wherein
2 the surface potential of said rubbing roller is controlled by;

3 bringing a charge control member into contact with the surface
4 of said rubbing roller; said charge control member being covered
5 with a material capable of being contact-charged to a polarity
6 different from the surface potential of said substrate member.

1 12. An apparatus for manufacturing a liquid-crystal display

2 element; the apparatus comprising:

3 a stage for supporting a substrate member to be treated;

4 a rubbing roller for rubbing an alignment film provided on the
5 surface of the substrate member; and

6 a charge control member for controlling the surface potential of
7 the rubbing roller.

1 13. The manufacturing apparatus according to claim 12,
2 wherein said charge control member is covered with a material
3 capable of being contact-charged to a polarity different from the
4 surface potential of said substrate member.

1 14. The manufacturing apparatus according to claim 12, which
2 further comprises:

3 a first sensor for measuring the surface potential of said
4 substrate member;

5 a second sensor for measuring the surface potential of said
6 rubbing roller;

7 a charge control member brought into contact with the surface
8 of said rubbing roller to control the potential of said rubbing roller;
9 and

10 a controller which controls the potential of said charge control
11 member in accordance with a measured value of the first sensor and a
12 measured value of the second sensor so that the surface potential of

13 said rubbing roller has the same polarity as the potential of said
14 substrate member.

1 15. A liquid-crystal display device comprising the
2 liquid-crystal display element manufactured by the method
3 according to claim 1.

1 16. A liquid-crystal display device comprising the
2 liquid-crystal display element manufactured by the method
3 according to claim 6.

1 17. A liquid-crystal display device comprising the
2 liquid-crystal display element manufactured by the method
3 according to claim 10.